

CLAIMS

1. A semiconductor device comprising a plurality of internal circuits constituted by a plurality of semiconductor elements; a control circuit having signal generating means for generating a signal varying in accordance with variations in fabrication process parameters or in operating condition; and internal power supply means for generating a voltage controlled by said signal from said generating means, wherein operation of said semiconductor elements or operation of at least a part of said circuits is controlled by said signal or said voltage.

2. A semiconductor device according to claim 1, wherein said control circuit includes means for detecting changes in the characteristics of said internal circuits for thereby performing the control in accordance with said changes in the characteristics.

3. A semiconductor device according to claim 1, further including a monitor circuit exhibiting similar changes in the characteristics as said internal circuit, wherein the control is performed by detecting the change in the characteristics of said monitor circuit.

4. A semiconductor device according to claim 2, wherein said control circuit detects change in the timing of a plurality of signals generated by said internal circuit, said control being performed in accordance with said change in the timing.

5. A semiconductor device according to claim 3,

wherein said control circuit detects change in the timing of a plurality of signals generated by said monitor circuit, said control being performed in accordance with said change in the timing.

6. A semiconductor device according to claim 1, wherein said control circuit controls the operating speed of a driver circuit contained in said internal circuit.

7. A semiconductor device according to claim 6, wherein said control is performed by a current mirror circuit.

8. A semiconductor device according to claim 6, wherein said control is carried out by controlling a gate voltage of a MOS transistor inserted between a driver circuit and a power supply source.

9. A semiconductor device according to claim 1, wherein said control circuit controls a differential amplifier included in said internal circuit.

10. A semiconductor device according to claim 9, wherein said differential amplifier is so controlled that the product of a load resistance and the current (i.e. the output amplitude thereof) is constantly maintained to be constant.

11. A semiconductor device including a plurality of internal circuits constituted by a plurality of semiconductor elements, further comprising a control circuit having signal generating means for generating a signal varying in accordance with deviations in

fabrication process parameters or in operating condition or internal power supply means for generating a controlled supply voltage, wherein operation of said semiconductor elements or operation of at least a part of said circuits is controlled by said signal or said voltage.

wherein at least a portion of said supply voltage is compensated in respect to fluctuation in a power supply voltage and variation in the temperature by means of a voltage transformer circuit incorporated in said semiconductor device, and at least a part of said internal circuits is operated by utilizing the output voltage produced by said voltage transformer circuit as a power supply voltage therefor.

12. A semiconductor device according to claim 11, wherein said internal circuit includes a driver circuit, said control being carried out by controlling the gate of a MOS transistor inserted between said driver circuit and the power supply voltage compensated with respect to said change.

13. A semiconductor device, comprising a voltage transformer circuit composed of a reference voltage generating circuit and a voltage amplifier for amplifying the output voltage of said reference voltage generating circuit; and means for compensating for change in the output voltage of said voltage transformer circuit brought about by variations in temperature and fluctuations in an external power supply voltage, wherein said output voltage is utilized as a power supply voltage for at

least a part of the circuits.

14. A semiconductor device according to claim 13, further including means for maintaining the output voltage of said voltage transformer circuit to be constant regardless of change in the external power supply voltage so long as said voltage lies within a desired range while varying said output voltage of said voltage transformer circuit in dependence on the change in said external power supply voltage when the latter varies beyond said desired range.

15. A semiconductor device according to claim 13, said voltage transformer circuit includes bipolar transistors.

16. A semiconductor device, comprising a group of circuitries constituting a dynamic memory, a circuit for generating a reference voltage with reference to which said group of circuitries are operated, and means for compensating variation in said reference voltage due to change in the temperature and change in an external power supply voltage.

17. A semiconductor device according to claim 16, wherein said dynamic memory controls voltages stored in memory cells for storing information with the aid of said reference voltage.

18. A semiconductor device according to claim 13, further including a group of circuitries constituting a static memory, a control circuit for generating a voltage with reference to which said group of circuitries

are operated, and means for compensating change in said reference voltage as brought about by variations in temperature and an external power supply voltage, wherein a voltage supplying a memory cell hold current to said static memory is controlled on the basis of said reference voltage.

19. A semiconductor device according to claim 14, further including means for compensating variation of said desired range which is brought about by variation in the temperature.

20. A semiconductor integrated circuit, comprising;
a semiconductor chip and a power supply terminal provided on said semiconductor chip for receiving a voltage from an external power supply source;

an internal circuit provided on said semiconductor chip;

a power supply circuit provided on said semiconductor chip for transforming an external power supply voltage received from said power supply terminal for supplying a source voltage resulting from said transformation to said internal circuit; and

a control circuit provided on said semiconductor chip for controlling said power supply circuit;

wherein said control circuit includes external power supply voltage detecting means and/or temperature detecting means and responds to the signal from said external power supply voltage detecting means and/or

said temperature detecting means by changing the power supply voltage to said internal circuit to thereby maintain the operating speed of said internal circuit to be constant.

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